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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/712,105	11/14/2000	Hirokazu Honda	NEC 00USFP553	7050

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EXAMINER

THAI, LUAN C

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 03/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/712,105

Applicant(s)

HONDA, HIROKAZU

Examiner

Luan Thai

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 13-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restriction

1. Applicant's election *without traverse* of Group I, claims 1-12 in Paper No. 6 is acknowledged.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of "a printed circuit board" in claim 2 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims **2 and 7-12** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 2, line 4, the phrase "without including a printed circuit board" is unclear as whether the device includes a printed circuit board or not. Not that none of Applicant invention's drawings (e.g., figures 2-4) shows the printed circuit board.

In claim 7, lines 4-5, the limitation of "a first insulating film of said insulating film" is unclear.

Claims 8-12 are rejected since each includes the limitations of independent claim 7.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2, 4-7, and 9, insofar as in compliance with 35 USC 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Chakravorty (6,181,569).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 1-2, 4-7, and 9, Chakravorty (figures 1-10, specifically see figures 8c and 8d) discloses a semiconductor device, comprising: pads 304 formed on a semiconductor chip 302; conductive sections 307 connected to the pads 304 via wiring pattern 307 provided on chip 302, respectively; conductive bumps 313-310 on surfaces of the conductive sections; an insulating film

including a stress buffering layer 308 of polyimide being in a lateral direction of the conductive sections and covering the semiconductor chip other than the surfaces of the conductive sections without including a printed circuit board, wherein the stress buffering layer includes a plurality of buffering layers 312 (also made of polyimide, Col. 8, lines 18+ and lines 46+). Chakravorty further discloses a first insulating film 305 of the insulating film, wherein the wiring pattern 307 extends to adjust a pitch between the conductive bump 313-310 and another conductive bump. Chakravorty does not explicitly teach the stress buffering layer 308 to relax a stress applied to the bumps.

However, since the stress buffering layer 308 in Chakravorty's structure device and that of the claimed invention are similar (e.g., similar in material (polyimide) and similar in position (in a lateral direction of the conductive sections)), the stress buffering layer 308 in Chakravorty's structure device would be obvious to include the characteristic of relaxing a stress applied to the bumps 313-310. Therefore, the claimed device would have been obviously unpatentable over Chakravorty.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chakravorty (6,181,569) in view of Farrar (6,077,792) and Goto et al. (6,214,923), separately.

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 3, the proposed device of Chakravorty discloses all the limitations of the claimed invention as detailed above except for teaching the stress buffering layer having an elastic modulus in a range of 0.01 to 8 Gpa. A stress buffering layer made of polyimide which has an elastic modulus in a range of 0.01 to 8 Gpa is conventional in the art, as taught by Farrar (Col. 5, lines 44+) and Goto et al. (Col. 24, lines 24+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the polyimide stress buffering layer having an elastic modulus in the claimed range for Chakravorty's device since such the claimed polyimide layer is conventionally used in the art.

8. Claims 8, 10, and 12, insofar as in compliance with 35 USC 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Chakravorty (6,181,569) in view of Yamamoto (5,925,931).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 8, the proposed device of Chakravorty discloses all the limitations of the claimed invention as detailed above except for the wiring pattern being formed of copper. Copper is a well known material in semiconductor art for making wiring pattern, as taught by Yamamoto (Col. 5, lines 17+). It would have been obvious to one of ordinary skill in the art at the time the invention was made

to use copper for forming the wiring pattern in Chakravorty's device since copper is a well known material in the semiconductor art.

Regarding claims 10 and 12, the proposed device of Chakravorty discloses all the limitations of the claimed invention (including the photosensitive layer 305, col. 8, lines 18+) as detailed above except for the first insulating film including a passivation film and a second insulating film formed on the passivation film.

Yamamoto (see specifically figure 4) while related to a similar chip-sized-package design teaches the first insulating film including a passivation film 24 covering the semiconductor chip 22 and a second insulating film 41 formed on the passivation film 24 in order to improve the electrical insulation between the wiring pattern 46 and the active surface of the semiconductor chip 22. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Yamamoto teachings to the proposed device of Chakravorty in order to improve the electrical insulation between the wiring pattern and the active surface of the semiconductor chip.

9. Claim 11, insofar as in compliance with 35 USC 112, is rejected under 35 U.S.C. 103(a) as being unpatentable over Chakravorty (6,181,569) in view of Yamamoto (5,925,931) and further in view of Kasahara et al. (5,790,362).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 11, the proposed device of Chakravorty and Yamamoto discloses all the limitations of the claimed invention as detailed above except for the second insulating film having a pyrolysis temperature of 200 degree C or more. The proposed device of Chakravorty and Yamamoto does teach that the second insulating film is made of polyimide, wherein a polyimide having a pyrolysis temperature of 200 degree C or more is conventional in the art, as taught by Kasahara et al. (Col. 9, lines 7+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use polyimide film having a pyrolysis temperature as claimed since such material is conventionally used in the semiconductor art.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is (703) 308-1211. The examiner can normally be reached on 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.


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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Luan Thai
March 10, 2002


DAVID L. TALBOTT
PRIMARY EXAMINER
ART UNIT ~~308~~
2827